

6.3 Applications of "e"

Solutions

Use a scientific calculator to evaluate each expression, accurate to two decimal places (x.xx)	
<p>1. e^2</p> <p>Press $e^x \Rightarrow 2 \Rightarrow \text{Enter}$.</p> <p>$e^2 \approx 7.389056099$</p> <p>$e^2 \approx \boxed{7.39}$</p>	<p>2. $e^{\frac{1}{2}}$</p>
<p>3. e^π</p> <p>Press $e^x \Rightarrow \pi \Rightarrow \text{Enter}$.</p> <p>$e^\pi \approx 23.14069263$</p> <p>$e^\pi \approx \boxed{23.14}$</p>	<p>4. $e^{2\pi}$</p>
<p>The population of aphids on a rose plant is given by the following formula: $P = 80e^{0.17t}$, where t is the time elapsed since the prior inspection of the plant. Write your answers rounded to the nearest whole number.</p>	
<p>5. Find the aphid population at 3 weeks following inspection.</p> <p>$P = 80e^{0.17t}$</p> <p>$P = 80e^{0.17(3)}$</p> <p>Press</p> <p>$80 \Rightarrow \times \Rightarrow e^x \Rightarrow (\Rightarrow 0.17 \Rightarrow \times \Rightarrow 3 \Rightarrow) \Rightarrow \text{Enter}$</p> <p>$P \approx 133.2232956$</p> <p>$P \approx \boxed{134 \text{ aphids}}$</p>	<p>6. Find the aphid population at 12 weeks following inspection.</p>
<p>Ten grams of tritium will be used in an experiment as a biochemical tracer. The amount of tritium remaining after t years will be $P = 10e^{-0.06t}$. Write your answers rounded to 2 decimal places (x.xx).</p>	
<p>7. Find the amount of tritium remaining in 5 years.</p> <p>$P = 10e^{-0.06t}$</p> <p>$P = 10e^{-0.06(5)}$</p> <p>Press</p> <p>$10 \Rightarrow \times \Rightarrow e^x \Rightarrow (\Rightarrow - 0.06 \Rightarrow \times \Rightarrow 5 \Rightarrow) \Rightarrow \text{Enter}$</p> <p>$P \approx 7.408182207$</p> <p>$P \approx \boxed{7.41 \text{ grams}}$</p>	<p>8. Find the amount of tritium remaining in 20 years.</p>
<p>Answers: 1. 7.39; 3. 23.14; 5. 134; 7. 7.41</p>	

Use the compound interest formula to find the accumulation amount for each of the following scenarios.

$$A = Pe^{rt}$$

- 9.** Principal: \$1,500
Annual rate: 7%
Number of years: 1
Compound: continuously

$$A = Pe^{rt}$$

$$A = 1500 e^{0.07 \cdot 1}$$

$$A = 1500 e^{0.07}$$

Press 1500 \Rightarrow \times \Rightarrow e^x \Rightarrow 0.07 \Rightarrow Enter

$$A \approx 1608.762272$$

$$A \approx \boxed{\$1,608.76}$$

- 10.** Principal: \$2,100
Annual rate: 6.5%
Number of years: 2
Compound: continuously

- 11.** Principal: \$3,200
Annual rate: 5.8%
Number of years: 3.5
Compound: continuously

$$A = Pe^{rt}$$

$$A = 3200 e^{0.058 \cdot 3.5}$$

$$A = 3200 e^{0.203}$$

Press 3200 \Rightarrow \times \Rightarrow e^x \Rightarrow 0.203 \Rightarrow Enter

$$A \approx 3920.231898$$

$$A \approx \boxed{\$3,920.23}$$

- 12.** Principal: \$1,450
Annual rate: 6.7%
Number of years: 2.5
Compound: continuously

Use the compound interest formula to find the amount of money that should be invested for each of the following scenarios to occur.

- 13.** Accumulated amount: \$50,000
Annual rate: 7%
Number of years: 10
Compound: continuously

$$A = Pe^{rt}$$

$$50000 = P e^{0.07 \cdot 10}$$

$$50000 = P e^7$$

$$\frac{50000}{e^7} = \frac{Pe^7}{e^7}$$

$$P \approx 24829.2651896$$

$$P \approx \boxed{\$24,829.27}$$

- 14.** Accumulated amount: \$35,000
Annual rate: 6%
Number of years: 12
Compound: continuously

Answers: **9.** \$1,608.76; **11.** \$3,920.23; **13.** \$24,829.27